



Dredge Island

Operations, Maintenance, and Monitoring Plan

Alcoa (Point Comfort) / Lavaca Bay Superfund Site

September 2003



APPENDIX D

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

This document represents the Operations, Monitoring, and Maintenance Plan (OMMP) for the Dredge Island at the Alcoa (Point Comfort)/Lavaca Bay Superfund Site in Point Comfort, Texas. Alcoa conducted a non-time critical removal action at the Dredge Island that was completed in 2001, as described below. This document presents an overview of the remedial action, the objectives of the inspection and monitoring program for Dredge Island, and other considerations. This OMMP is one of a series of RDRs and OMMPs that collectively provide the design for the entire Site remedy as defined in the Record of Decision (ROD) (EPA, 2002). These reports have been prepared as attachments to the Consent Decree.

1.2 SITE DESCRIPTION

The Site is defined in the Administrative Order on Consent (AOC) and in the Project Management Plan (PMP) (Alcoa, 1996). Specifically, the area covered by this OMMP is the Dredge Island, located west of the PCO facility in Lavaca Bay (Figures 1-1 and 1-2). Dredge Island is a discrete landform created in the late 1950's when dredge materials from dredging activities to create the Alcoa Ship Channel and the R-10 Unloading Dock were placed on a shallow reef trending north-south approximately 1000 feet west of the shoreline. Subsequent dredge activities and waste material management practices between the late 1950's and 1989 resulted in the enlargement of the footprint of the island. These activities resulted in the placement of materials on Dredge Island that contained mercury concentrations that potentially posed an unacceptable risk to human health and the environment. A detailed description of the history of Dredge Island is contained in Alcoa, 1997a.

1.3 REMEDY OVERVIEW

An Engineering Evaluation/Cost Analysis (EE/CA) for a non-time critical removal action was conducted by Alcoa for the Dredge Island in 1997 (Alcoa, 1997b). A streamlined risk evaluation, prepared as part of the EE/CA, indicated that mercury from Dredge Island could enter Lavaca Bay via erosion of mercury-contaminated soils. Based on that finding, the EE/CA documented the selection of a removal action that minimized the potential for the release of hazardous constituents from the island due to either uncontrolled erosion during normal storm events or due to the effects of more intense storms (e.g., hurricanes).

The removal action was conducted between 1998 and 2001, and is referred to as the "Dredge Island Stabilization Project." The project included relocating the contents of the Dredge Materials Placement Areas (DMPAs) containing elevated levels of mercury (approximately 523,000 cubic yards) into the Gypsum Placement Areas (GPAs). In addition, the containment dikes surrounding the GPAs were raised so that they would not be overtopped during a design storm. This required increasing 10,700 linear feet of dike to an approximate elevation of 30 feet msl. As part of this work, the marshes on the north end of the island were removed. Erosion protection and runoff control structures were also installed on the island. A detailed description of the scope of the removal action is contained in Alcoa, 1997b. The final design and as-built drawings for the Dredge Island remedy are contained in the *Dredge Island Removal Action Plan, Volume 4 - Phase 1 Dredge Island Stabilization Completion Report*, hereafter referred to as *Volume 4* (Alcoa, 2002).

1.4 PERFORMANCE OBJECTIVES AND STANDARDS

The performance objective for the Dredge Island remedy is to interrupt the potential direct exposure pathway of contaminants in soils and sediments from Dredge Island as a result of a significant storm event or uncontrolled erosion during stormwater runoff. The removal action and reconfiguration of Dredge Island achieved this objective through engineering means, and therefore the performance objective for this OMMP is to preserve the integrity of the reconfigured island through frequent inspections and maintenance and/or repairs, as needed.

1.5 PLAN REVIEW AND REVISION

At the end of each calendar year, Alcoa will review the effectiveness of the OMMP in meeting the monitoring objectives. At that time, changes, which may include additions or deletions to the scope of the program, will be proposed for Agency review in an effort to better meet the objectives of the OMMP. Upon Agency acceptance, the changes will be incorporated into the OMMP for the remainder of the monitoring period, or until further changes are deemed necessary.

The procedures presented in this OMMP are based on methods that have been successful at other similar locations. Future site conditions and/or changes in technology may necessitate modifications to these procedures. Any permanent changes or temporary deviations will be documented and reported to the Agencies in a timely manner. If possible, these changes will be reported to the Agencies prior to implementation unless required in the field.

2.0 REMEDIAL DESIGN

The following construction activities were completed at the Dredge Island as a result of the remedial action, as illustrated on Figure 1-2:

- Construction of temporary access bridge;
- Construction of Alcoa confined disposal facility (CDF) dikes;
- Consolidation of DMPA maintenance dredge material and reconfiguration of the Calhoun County Navigational District (CCND) CDF;
- Consolidation of material outside of CDF dikes;
- Installation of two waterstops at the Alcoa CDF dike and CCND CDF dike intersections;
- Installation of two decant structures in the Alcoa CDF;
- Installation of an emergency spillway in the Alcoa CDF dike;
- Construction of dike storm protection on Alcoa's CDF;
- Construction of dike erosion protection on Alcoa's CDF; and
- Construction of a gravel road on Alcoa's CDF dikes.

The Alcoa CDF is capable of receiving additional hydraulically placed material. Subsequent dredge placement (future phases) will consist of one or more dredge events, culminating in the placement of the final cover, which will consist of hydraulically placed dredge material taken from an area of Lavaca Bay that has insignificant mercury content. After this final placement, closure and post-closure care activities will commence.

The ultimate closure of Dredge Island will include the following being implemented in the future:

- **Cover** - The future final cover for the Alcoa CDF may consist of dredge material, hydraulically placed, taken from an area of Lavaca Bay that has insignificant mercury content (e.g., maintenance dredging, TXDOT dredging). This placement will occur at some time in the future and is not part of Phase 1 of the Dredge Island stabilization construction project.
- **Erosion Protection on the Final Cover** - The future final cover will have gentle slopes so that the runoff resulting from rainfall events in the interior of the CDF will have low overland flow velocities. These low velocities will minimize the erosion of the cover material by the rainwater runoff. Additionally, a small area immediately surrounding the discharge structure will be excavated to create a

settling basin to allow ponding of the runoff prior to release. This ponding will allow suspended cover material to settle out of the runoff before it is discharged.

- Drainage Structures - The dredge decant structures will be retrofitted to function as stormwater drainage structures.

3.0 OPERATION, MAINTENANCE, AND MONITORING

Section 4 of *Volume 4* describes the components of the Phase 1 construction that require periodic inspections and maintenance, including the following:

- The access bridge from mainland to northern shore of Dredge Island;
- The 10,500 lineal feet of the Alcoa CDF containment dikes;
- The storm protection on the Alcoa CDF dike exterior, including the armor layer, underlayer, and dike toe protection;
- The gravel erosion protection on the exterior dike slopes above the armor protections and the interior dike slopes above 26.5 ft (NGVD 1929);
- The 25-ft. long concrete emergency spillway;
- The two dredge decant structures including the discharge structures;
- The two waterstops installed in the CCND CDF dikes; and
- The road on the Alcoa CDF dikes.

Volume 4 also addresses minimum inspection and maintenance procedures, and post-closure requirements to be followed throughout the active life of the Phase 1 CDF. These procedures are presented in Appendix A.

4.0 ADDITIONAL OPERATIONS, MAINTENANCE, AND MONITORING CONSIDERATIONS

4.1 SCHEDULE

A schedule for inspections of Dredge Island is provided in Appendix A. Inspections of specific components of Dredge Island will occur at varying frequencies, either monthly, quarterly, biannually, annually, after storm events or after placement of dredge material in the CDF.

4.2 HEALTH AND SAFETY AND MONITORING

A Health and Safety Plan (HSP) addressing maintenance of the capped area has been prepared and will be maintained on site at all times.

4.3 REPORTING REQUIREMENTS

The monitoring information collected as part of this OMMP will be reported to the regulatory agencies on an annual basis in the form of an annual monitoring report.

5.0 REFERENCES

Alcoa, 1996. *Project Management Plan for Alcoa (Point Comfort)/Lavaca Bay Superfund Site*. July.

———, 1997a. *Data Report, Surface Runoff, Sediments and Groundwater Investigation, Dredge Island, Volume B5a, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*. February.

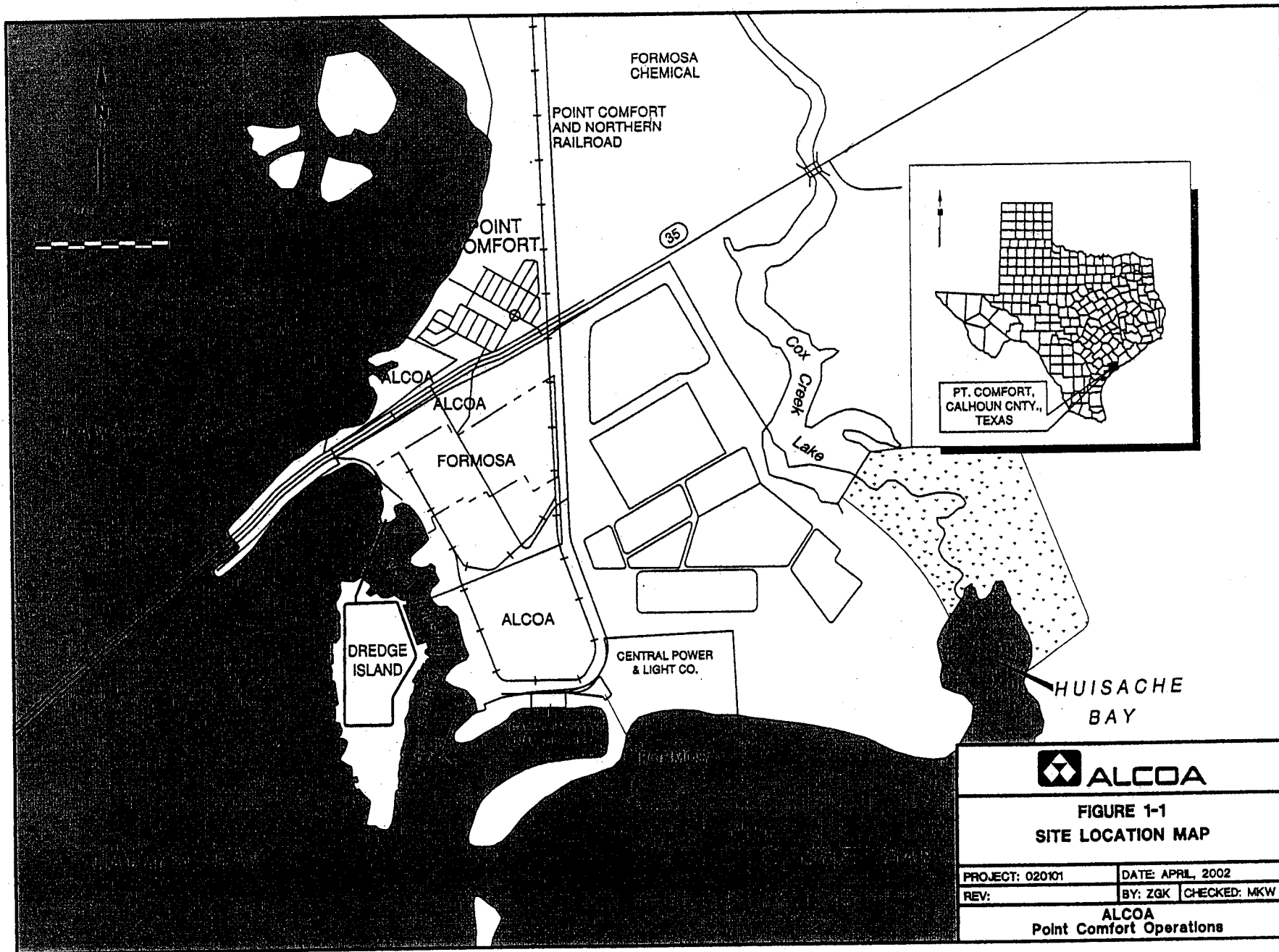
———, 1997b. *Engineering Evaluation/Cost Analysis for a Non-Time Critical Removal Action on Dredge Island, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*. March.

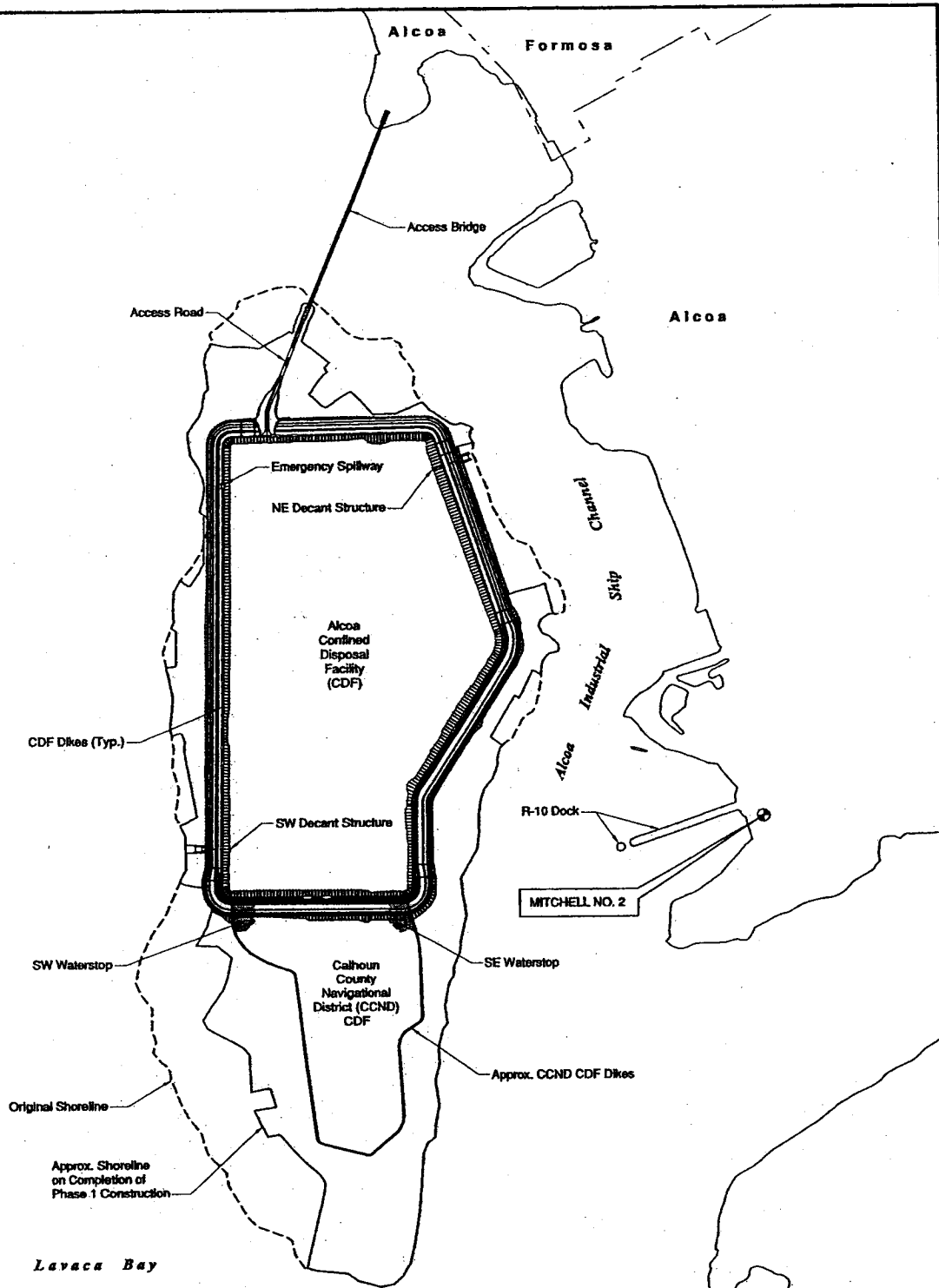
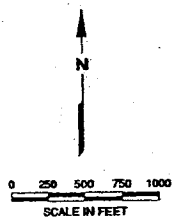
———, 2000. *Feasibility Study Alcoa (Point Comfort)/Lavaca Bay Superfund Site*.

———, 2002. *Dredge Island Removal Action Plan, Volume 4 - Phase 1 Dredge Island Stabilization Completion Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*. June.

United States Environmental Protection Agency (EPA), 2002. *Record of Decision, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*.

FIGURES





**FIGURE 1-2
DREDGE ISLAND CURRENT
CONFIGURATION**

PROJECT: 020101	DATE: APRIL, 2002
REV:	BY: ZGK CHECKED: MKW

**ALCOA
Point Comfort Operations**

APPENDICES

1.0 INTRODUCTION

This document is the *Dredge Island Removal Action Plan, Volume 4 - Phase 1 Dredge Island Stabilization Completion Report*, hereafter referred to as *Volume 4*. The Dredge Island Removal Action Plan (RAP) is a multi-volume series of documents and drawings intended to provide documentation of all appropriate design and construction activities proposed and subsequently implemented for Phase 1 of the Dredge Island Removal Action. Dredge Island is part of the Alcoa Point Comfort Operations (PCO), Lavaca Bay Superfund Site, located near Point Comfort, Texas. Dredge Island is located adjacent to, and east of, Lavaca Bay, and just offshore of the PCO facility. The location of the Alcoa PCO facility, including Dredge Island, is shown in Figure 1-1.

1.1 Purpose of Document

The purpose of *Volume 4* is to document the extent to which construction was executed in conformance with the Agency-approved drawings and specifications contained in *Dredge Island Removal Action Plan-Phase 1, Volume 3, Phase 1 Design, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*, (Alcoa, 28 May 1999) (*Drawings and Specifications*). *Volume 4* also serves as an Operations and Maintenance Plan (O&M Plan) for Dredge Island for that period after Phase 1 construction is completed and before final closure of Dredge Island is achieved. This O&M Plan contained in *Volume 4* is considered an "interim" O&M Plan to serve during the post Phase 1 period. After final closure (see Section 1.3.4 for ultimate closure discussion) the final O&M Plan will be developed by Alcoa.

1.2 Organization of Document

Section 1 of this document contains background information on Dredge Island, and details of Phase 1 of the Dredge Island Removal Action Plan. Section 2 presents an overview of the design and functional description of key elements of the dike surrounding the Confined Disposal Facility (CDF) and the dredge decant structures. Section 3 contains as-built descriptions of the components of Phase 1 construction, and a comparison of their respective conformance to the plans and specifications. Section 4 addresses inspection and maintenance procedures, and Section 5 describes the duties and responsibilities of operations and maintenance personnel.

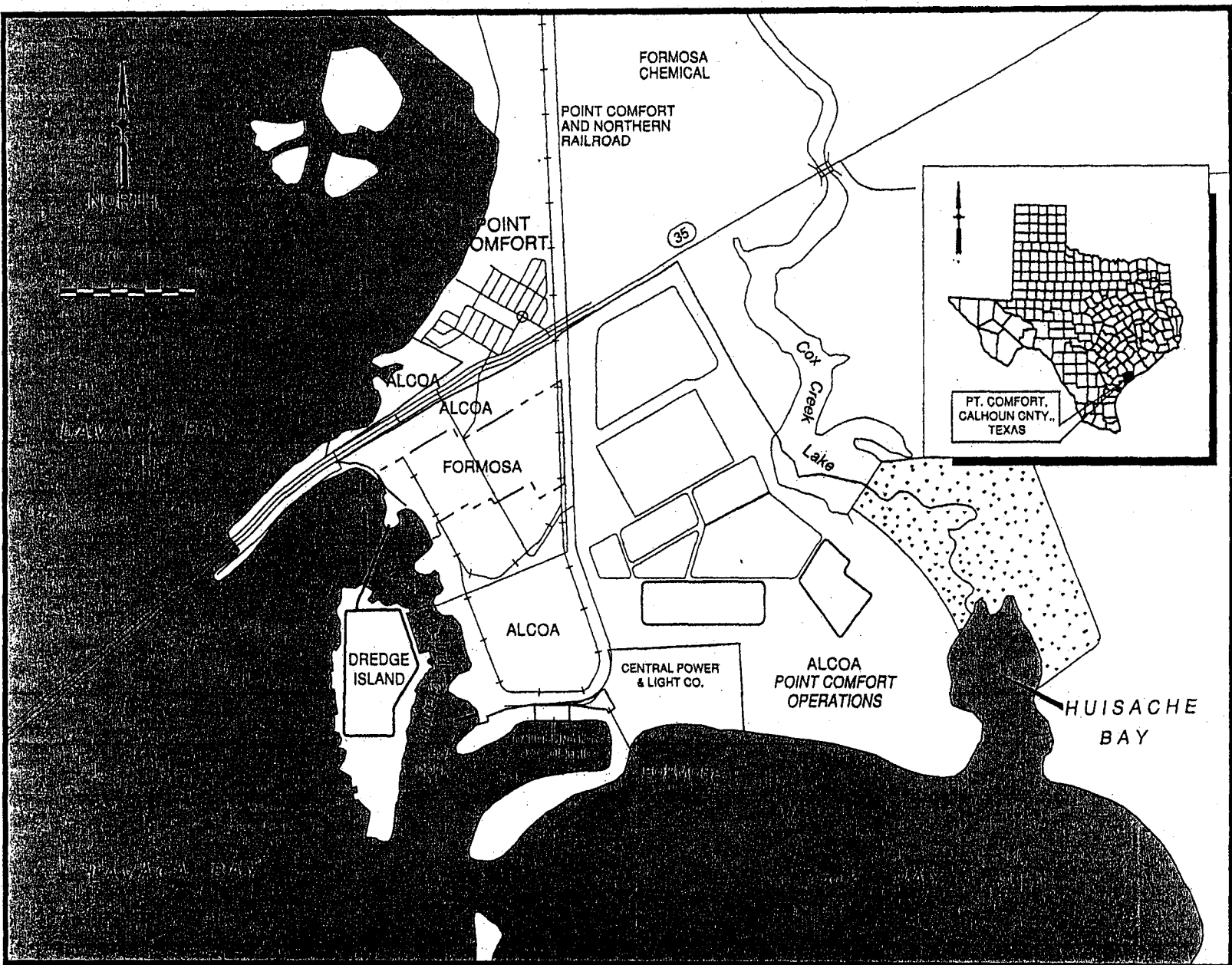


FIGURE 1-1
SITE LOCATION MAP

Appendices are included at the end of this report to provide supporting documentation. Appendix A contains a set of half-size original design drawings for the Phase 1 Removal Action. Appendix B contains a set of half-size as-built drawings for the Phase 1 Removal Action. Appendix C contains the Problem Identification and Correction Reports that were generated during construction activities. Appendix D contains field Quality Assurance documentation. Appendix E contains soil verification sample data and dredge decant water sample data. Appendix F presents a post-closure Health and Safety Plan Template that was developed for this site.

This template is only provided for information, and should not be implemented without the involvement of a qualified health and safety professional. Appendix G contains Section 5 of the Alcoa Health and Safety Manual – Emergency Response Procedures.

1.3 Background Information

This section gives a brief description of Dredge Island, reviews the history of waste management on the Island, summarizes the regulatory actions, and summarizes the remedial design objectives.

1.3.1 Waste History

Dredge Island is located in Lavaca Bay west of Alcoa PCO and is a discrete landform initially created from dredging activities during construction of the Alcoa PCO Plant. Dredge Island later received waste material from the Alcoa facility and from channel dredging activities in the vicinity of Alcoa. The Island has been used for the management and disposal of dredge material since 1957. The East and West Gypsum Placement Areas (GPAs), shown on Figure 1-2, have been used for the disposal of gypsum, treated wastewater effluent from the Chlor-Alkali Process Area (1970), and dredge material from the Industrial Channel. Five Dredge Material Placement Areas (DMPAs) were used in 1971 and 1972 to contain maintenance dredging material removed from the Alcoa Industrial Channel. In 1984 the dredge material in DMPA 5 was relocated to the other four DMPAs.

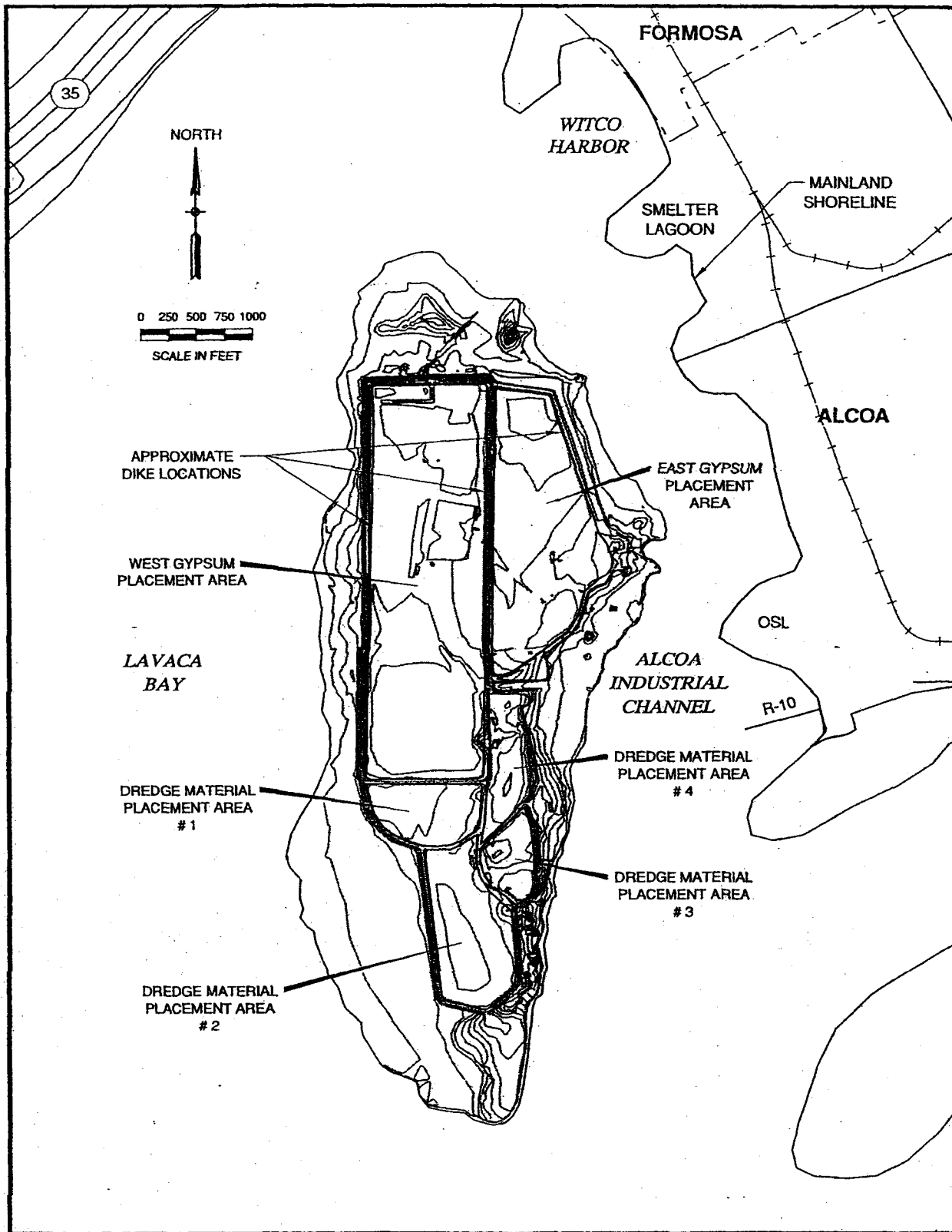


FIGURE 1-2
DREDGE ISLAND PRE-REMOVAL ACTION CONFIGURATION MAP

1.3.2 Site Description

The post-construction Island is approximately 315 acres in size, with a maximum length (north-south) of 7,770 feet, and a maximum width (east - west) of 3,050 feet. The shoreline (perimeter) of Dredge Island is approximately 21,400 feet in length. Figure 1-3 shows the current configuration of the Island and the locations of the access bridge, the CDF dike, the emergency spillway, the waterstop locations, and the dredge decant structures.

Additional detail of the Dredge Island site history, site characterization, and the nature and extent of contamination are contained in the following documents:

- Data Report - Alcoa (Point Comfort)/Lavaca Bay Superfund Site, Volume B5a: Sampling and Analysis Plan - Surface Runoff, Sediment and Groundwater Investigation, *Dredge Island - Volume 1*, (Alcoa, March 1997);
- Data Report - Alcoa (Point Comfort)/Lavaca Bay Superfund Site, Volume B5a: Sampling and Analysis Plan - Surface Runoff, Sediment and Groundwater Investigation, *Dredge Island - Volume 2*, (Alcoa, March 1997); and
- Engineering Evaluation/Cost Analysis for a Non-Time Critical Removal Action on Dredge Island, Alcoa (Point Comfort)/Lavaca Bay Superfund Site, (*Alcoa, July 3, 1997*) (referred to as the EE/CA).

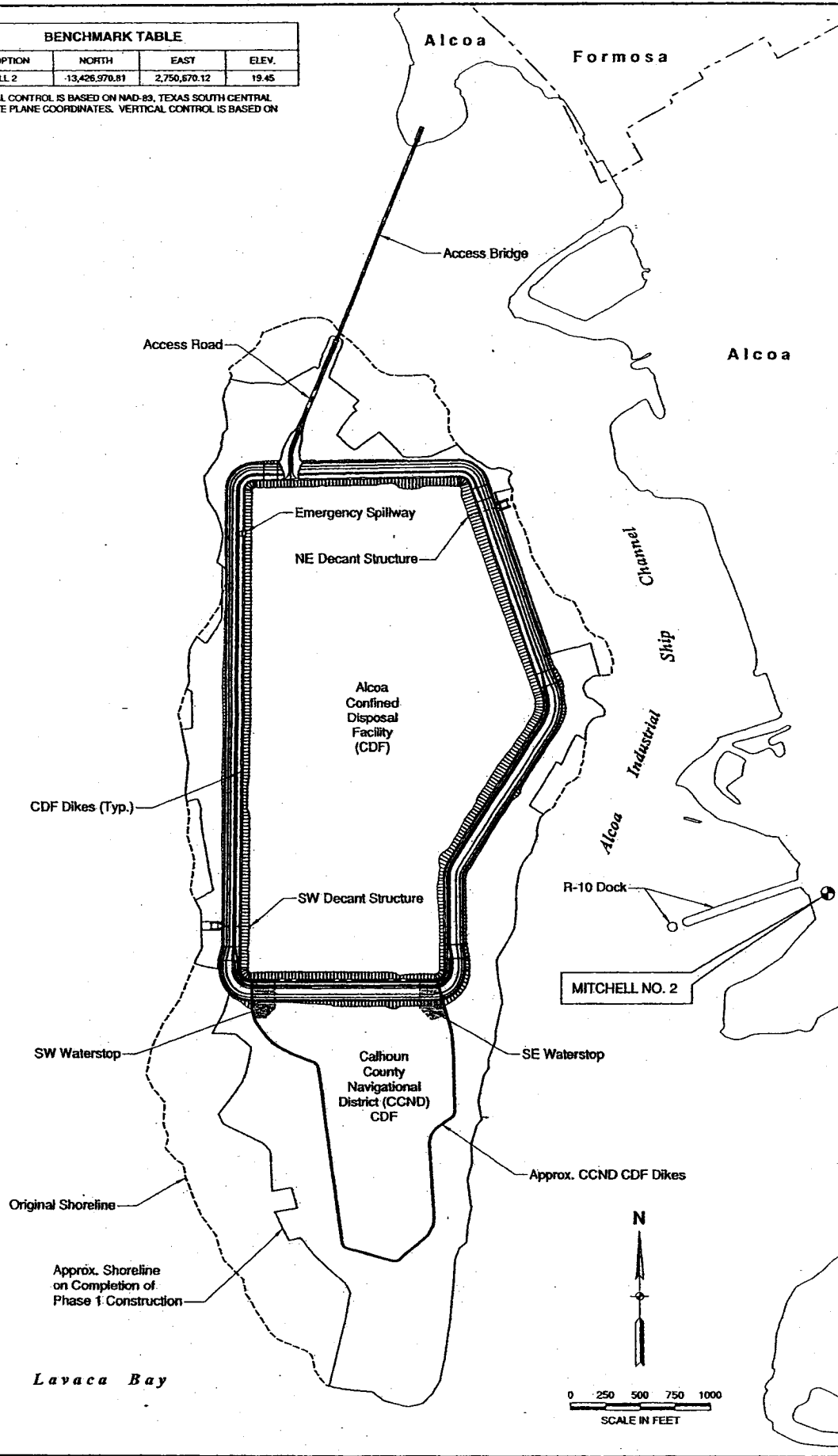
The Phase 1 Removal Action was conducted in accordance with the following agency-approved document detailing the Removal Action Plan:

- *Dredge Island Removal Action Plan-Phase 1, Volume 1, Design Basis/ARARs Analysis, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*, (Alcoa, September 15, 1998);
- *Dredge Island Removal Action Plan-Phase 1, Volume 2, Material Use Plan, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*, (Alcoa, September 15, 1998);
- *Dredge Island Removal Action Plan-Phase 1, Volume 3, Phase 1 Design, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*, (Alcoa, 28 May 1999); and
- *Dredge Island Removal Action Plan-Phase 1, Volume 3, Phase 1 Design-Engineering Calculations, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*, (Alcoa, 28 May 1999).

BENCHMARK TABLE

BM DESCRIPTION	NORTH	EAST	ELEV.
MITCHELL 2	13,426,970.81	2,750,670.12	19.45

HORIZONTAL CONTROL IS BASED ON NAD-83, TEXAS SOUTH CENTRAL ZONE, STATE PLANE COORDINATES. VERTICAL CONTROL IS BASED ON 1929 NGVD.



1.3.3 Summary of Regulatory Actions

The Alcoa (PCO)/Lavaca Bay Superfund Site was placed on the National Priorities List on 23 February 1994, with an effective listing date of 25 March 1994. The Administrative Order on Consent (AOC), which was issued on 31 March 1994, under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), requires that a Remedial Investigation (RI), Baseline Risk Assessment (BLRA), and a Feasibility Study (FS) be performed at the site. The AOC contains a Statement of Work (SOW) in its Attachment D detailing the requirement for the RI, BLRA, and FS. Additional regulatory background information can be found in the *Preliminary Site Characterization Report, Alcoa (Point Comfort)/Lavaca Bay Superfund Site*, (Alcoa, July 10, 1995) (referred to as the PSCR). The RI was conducted in accordance with Guidance for Conducting Report Remedial Investigations and Feasibility Studies Under CERCLA (EPA/G-89/004).

The stated purposes of the AOC/SOW are:

- To determine the nature and extent of contamination within the Study Area based on risk to human health and the environment. (The Study Area has been defined in the agency approved Project Management Plan as "the geographic area within which there is a threat or potential threat to human health, welfare, and the environment caused by the release or threatened release of hazardous substance, pollutants, or contaminants that are associated with activities at or originating from the plant or Dredge Island.");
- To determine and evaluate alternatives for remedial actions (if any) to prevent, mitigate or otherwise respond to, or remedy, any release or threatened release of hazardous substance, pollutants, or contaminants within the Study Area and within the Site, by conducting a feasibility study;
- To identify and evaluate actual or potential risks to human health and the environment by conducting a baseline risk assessment; and
- To protect public health, welfare, and the environment by carrying out removal actions that may be agreed to by the parties.

1.3.4 Summary of the Dredge Island Removal Action - Phase 1

The objectives of the Dredge Island Removal Action Plan - Phase 1 were:

- To minimize the potential for the release of contaminants from the former Gypsum Placement Areas (GPAs) and the former Dredge Material Placement Areas (DMPAs) (See Figure 1-2); and
- To minimize erosion of mercury-contaminated soils outside the dikes into Lavaca Bay as the result of a significant storm event or uncontrolled erosion during stormwater runoff.

The resultant configuration of the Dredge Island Removal Action Plan - Phase 1 is illustrated in Figure 1-3, and consists of the following:

- Construction of Timber Access Bridge;
- Construction of Alcoa CDF Dikes;
- Consolidation of DMPA Maintenance Dredge Material and Reconfiguration of the Calhoun County Navigational District (CCND) CDF;
- Consolidation of Material Outside of CDF Dikes;
- Two Waterstops installed at the Alcoa CDF Dike and CCND CDF Dike Intersections;
- Two Decant Structures installed in the Alcoa CDF;
- An Emergency Spillway installed in the Alcoa CDF Dike;
- Dike Storm Protection on Alcoa's CDF;
- Dike Erosion Protection on Alcoa's CDF; and
- Gravel Road Constructed on Alcoa's CDF Dikes.

The Alcoa CDF, as constructed during Phase 1, is capable of receiving additional hydraulically placed material. Subsequent dredge placement (future phases) will consist of one or more dredge events, culminating in the placement of the final cover, which will consist of hydraulically placed dredge material taken from an area of Lavaca Bay that has insignificant mercury content. After this final placement, closure and post-closure care activities will commence.

The ultimate closure of Dredge Island will include the following being implemented in the future:

- Cover - The future final cover for the Alcoa CDF may consist of dredge material, hydraulically placed, taken from an area of Lavaca Bay that has insignificant mercury content (e.g., maintenance dredging, TXDOT dredging). This placement will occur at some time in the future and is not part of Phase 1 of the Dredge Island stabilization construction project.
- Erosion Protection on the Final Cover - The future final cover will have gentle slopes so that the runoff resulting from rainfall events in the interior of the CDF will have low overland flow velocities. These low velocities will minimize the erosion of the cover material by the rainwater runoff. Additionally, a small area immediately surrounding the discharge structure will be excavated to create a settling basin to allow ponding of the runoff prior to release. This ponding will allow suspended cover material to settle out of the runoff before it is discharged.
- Drainage Structures - The dredge decant structures will be retrofitted to function as stormwater drainage structures.

Section 4 of *Volume 4* deals with the components of the Phase 1 construction that require periodic inspections and maintenance, including the following:

- Access bridge from mainland to northern shore of Dredge Island;
- The 10,500 lineal feet of the Alcoa CDF containment dikes;
- The storm protection on the Alcoa CDF dike exterior, including the armor layer, underlayer and dike toe protection;
- The gravel erosion protection on the exterior dike slopes above the armor protections and the interior dike slopes above 26.5 ft (NGVD 1929);
- The 25-ft. long concrete emergency spillway;
- The two dredge decant structures including the discharge structures;
- The two waterstops installed in the CCND CDF dikes; and
- The road on the Alcoa CDF dikes.

1.4 Post-Closure Care Requirements

This section describes general operation and post-closure care considerations for the Alcoa CDF on Dredge Island.

At a minimum, Alcoa needs to maintain copies of all reports of inspections performed by Alcoa or other independent parties, field reports documenting inspections, and in-house records such as laboratory results and contractor's logs.

1.4.1 Operation Requirements

Placement of dredge material into the Alcoa CDF will be conducted in accordance with Alcoa's USACE dredge permit. Specifically, Alcoa will require the dredge contractor to meet the State of Texas specified limit (5 μ g/L) in the USACE dredge permit for decant water discharges.

Water discharge practices should be conducted to minimize freestanding water within the Alcoa CDF. During both dredge placement and rainfall runoff management, the weir boards in the decant structures should be installed to ensure the water elevation within the Alcoa CDF is maintained at the lowest elevation without causing excess sediment discharge, and that the water level never rises above 28.5 ft (NGVD 1929). This can be accomplished by keeping the elevation of the weir boards in the decant structure at an appropriate elevation.

Improper management of both the Alcoa CDF and CCND CDF is likely to have dire consequences. During dredge placement and/or other future operations, the following issues should be taken into consideration:

The south dike of the Alcoa CDF forms the north boundary of the CCND CDF. Malfunction of the waterstop and subsequent failure of the CCND CDF dikes can result from removing cover soil or exposing or damaging the HDPE liner.

Allowing water to stand in either the Alcoa CDF or CCND CDF for extended periods of time will cause saturated soil conditions in the inundated slopes. These conditions can lead to rapid drawdown failures of the slopes when the water level is lowered too quickly. Water levels in both the Alcoa CDF

and the CCND CDF should be minimized at all times. Ponded water should be drained from within the CDFs, as soon after it occurs as possible, to prevent excessive saturation of the dikes. Sudden drawdowns of ponded water should be avoided because they have the potential to cause dike failure. Dredge pipe discharges should be placed such that they do not cause damage to either the Alcoa CDF dikes or CCND CDF dikes.

In addition to the above considerations, future dredging plans should include the following:
Coordination of dredging operations in both the Alcoa CDF and CCND CDF; and
Periodic inspections of the containment dikes (particularly in the area of the waterstop) before, during and after dredge placement operations.

A registered professional engineer should review the operating plans for the CDFs to determine whether they are appropriate for maintaining the safety of the CDFs.

1.4.2 Closure Requirements

Future dredge material placed into the Alcoa CDF should be aggressively dewatered and consolidated to maximize available capacity. Four feet of clean fill will then be placed on top of the dredged material. The future final cover for the Alcoa CDF may consist of a 4-foot thick dredge material cover, hydraulically placed, taken from an area of Lavaca Bay that has an insignificant mercury content (e.g., maintenance dredging, TXDOT dredging). This placement will occur at some time in the future and is not part of Phase 1 of the Dredge Island stabilization construction project. This will bring the final cap to a relatively flat elevation of 26.5 feet (NGVD 1929).

The future final cover should be placed such that it has gentle slopes so that the runoff resulting from rainfall events in the interior of the Alcoa CDF will have low overland flow velocities. These low velocities will minimize the erosion of the cover material by the rainwater runoff. Additionally, a small area immediately surrounding the discharge structure will be excavated to create a settling basin to allow ponding of the runoff prior to release. This ponding will allow suspended cover material to settle out of the runoff before it is discharged.

4.0 SITE INSPECTION AND MAINTENANCE

4.1 General

This section of *Volume 4* addresses minimum inspection and maintenance procedures to be followed throughout the active life of the Phase 1 CDF. This section of *Volume 4* should be revised to cover the post-closure period after the final cover (four-foot thick clean dredge material) has been installed. Maintenance will be performed only on an as needed basis on these elements found to be deteriorating or in need of repair during the inspections.

The health and safety requirements for inspection and maintenance activities are provided in Appendix F (Site-Specific Health and Safety requirements) and Appendix G (Alcoa's facility emergency response procedures).

4.2 Removal Action Plan Phase 1 Inspection Frequency

The following items will require periodic inspection and maintenance:

- Dredge Island in general;
- Access bridge from mainland to northern shore of Dredge Island;
- 10,500 lineal feet of the Alcoa CDF containment dikes;
- Storm protection on the Alcoa CDF dike exterior, including the armor layer, underlayer and dike toe protection;
- Gravel erosion protection on the exterior dike slopes above the armor protection and the interior dike slopes above 26.5 ft (NGVD 1929);
- 25-feet long concrete emergency spillway;
- Two dredge decant structures including the discharge structures;
- Road on the Alcoa CDF dikes;

- Two waterstops installed in the CCND CDF dikes; and
- Reflectors and station tags.

A list of potential inspection items associated with each of the above elements is presented in Figure 4.1 – Schedule for Inspections. The inspection schedule is approximate, and all inspections may not result in written documentation unless problems are found. Maintenance will be performed only on an as needed basis on these elements found to be deteriorating or in need of repair during the inspections.

To assist in problem documentation, station numbers have been placed on reflector posts approximately every 500 feet along the dike. Figure 4-2 – Station Number Locations shows where the station numbers are located.

4.3 Inspection Reporting

An inspection log with explanations of observations made will document each inspection and become part of the operating records for the Dredge Island.

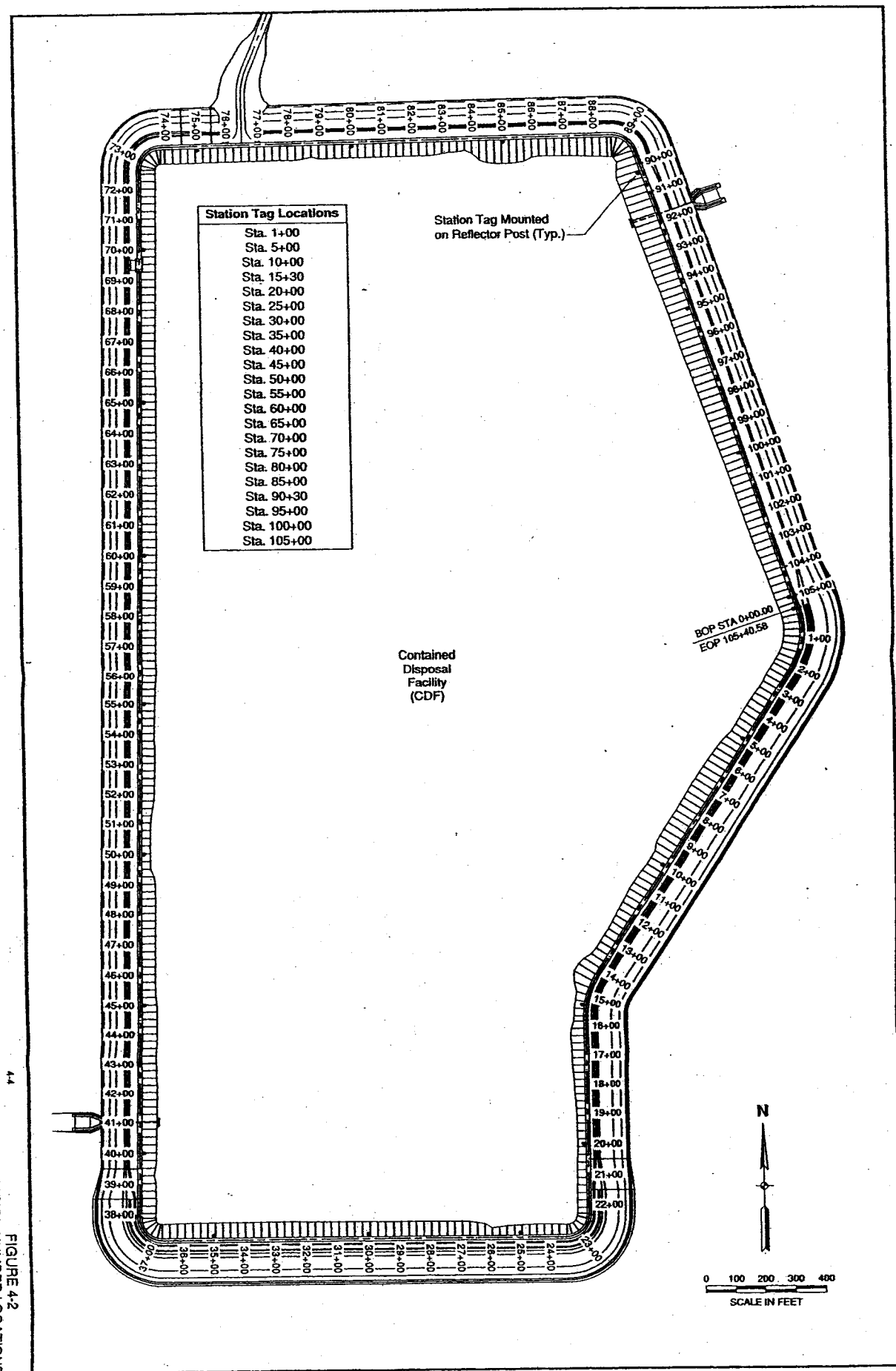
Inspection logs will be in a checklist/fill-in-the-blank format. A typical inspection log is shown in Figure 4-3 – Typical Inspection Log. All site inspection reports will include the date, place, time, weather, and names of individuals conducting the inspection. The log is formatted to ensure a specific itinerary is followed and that all pertinent facilities are inspected. The log also includes a checklist of typical problems associated with each item to be inspected. Blank spaces are provided to record observations, comments, and corrective actions implemented. The inspection logs will be supplemented, as necessary, with photographs, written reports documenting failures and mitigating actions taken.

The inspection logs will be maintained in a permanent binder. Separate written reports documenting maintenance activities and repairs shall be recorded together with these logs. These inspection and maintenance logs are of utmost importance to provide a post-closure case history for the Dredge Island.

Preventative/non-emergency maintenance shall be completed as soon as practical to preclude further damage and minimize the need for emergency corrective action. If a hazard is determined to be

Specific Item	Typical Problems	Minimum Suggested Visual Frequency ⁽¹⁾						Notes
		Monthly	Quarterly	Biannually	Annually	After Storm	Daily During Dredge Placement	
General Dredge Island	Erosion Deterioration Settling/Ponding Uplift Washouts Rodent Holes		✓			✓		Written reports will be made if problems are encountered. Maintenance to be performed as required.
Access Bridge	Deterioration Damage Navigation Lights		✓			✓		Written reports will be made if problems are encountered. Maintenance to be performed as required.
CDF Dike	Erosion Deterioration Damage Vegetation		✓			✓	✓	Written reports will be made if problems are encountered. Maintenance to be performed as required. Trees and shrubs on dikes should be removed.
Stone Storm Protection	Erosion Settlement Stone Deterioration Stone Movement Fabric Exposure Damage			✓		✓		Written reports will be made if problems are encountered. Maintenance to be performed as required.
Gravel Erosion Protection	Erosion Fabric Exposure Deterioration Damage		✓			✓		Written reports will be made if problems are encountered. Maintenance to be performed as required.
Emergency Spillway	Obstructions Cracks in Concrete Deterioration Damage			✓		✓	✓	Written reports will be made if problems are encountered. Maintenance to be performed as required.
Decant Structures	Weir Board Elevation Depth of Water Obstructions Deterioration Rust/Corrosion Damage Overflow Quality Overflow Quantity Flap Gate			✓		✓	✓	Written reports will be made if problems are encountered. Maintenance to be performed as required.
Gravel Road	Potholes Ponding Deterioration Washouts		✓			✓		Written reports will be made if problems are encountered. Maintenance to be performed as required.
Waterstops	Erosion Membrane Exposed Deterioration Damage			✓		✓	✓	Written reports will be made if problems are encountered. Maintenance to be performed as required.
Reflectors Station Tags	Intact/Reflecting Intact/Legibility				✓			Written reports will be made if problems are encountered. Maintenance to be performed as required.
Notes: (1) Increase frequency of inspections as necessary. (2) File all completed inspection logs and maintenance requirements.								

FIGURE 4-1
SCHEDULE FOR INSPECTIONS



SITE INSPECTION LOG				Inspector's Signature: _____ Date: _____ Time Begin: _____ Time End: _____ Sheet: _____ of _____	
Inspector's Name: _____ Weather: _____ Temperature: _____					
Specific Item to Inspect	Typical Problems Encountered	Conditions Observed		Comments or Corrective Action(s) Implemented and Dates	
		Normal	Abnormal		
General Dredge Island	Erosion	<input type="checkbox"/>	<input type="checkbox"/>		
	Deterioration	<input type="checkbox"/>	<input type="checkbox"/>		
	Settling/Ponding	<input type="checkbox"/>	<input type="checkbox"/>		
	Uplift	<input type="checkbox"/>	<input type="checkbox"/>		
	Washouts	<input type="checkbox"/>	<input type="checkbox"/>		
	Rodent Holes	<input type="checkbox"/>	<input type="checkbox"/>		
Access Bridge	Deterioration	<input type="checkbox"/>	<input type="checkbox"/>		
	Damage	<input type="checkbox"/>	<input type="checkbox"/>		
	Navigation Lights	<input type="checkbox"/>	<input type="checkbox"/>		
CDF Dike	Erosion	<input type="checkbox"/>	<input type="checkbox"/>		
	Deterioration	<input type="checkbox"/>	<input type="checkbox"/>		
	Damage	<input type="checkbox"/>	<input type="checkbox"/>		
	Vegetation	<input type="checkbox"/>	<input type="checkbox"/>		
Stone Storm Protection	Erosion	<input type="checkbox"/>	<input type="checkbox"/>		
	Settlement	<input type="checkbox"/>	<input type="checkbox"/>		
	Stone Deterioration	<input type="checkbox"/>	<input type="checkbox"/>		
	Stone Movement	<input type="checkbox"/>	<input type="checkbox"/>		
	Fabric Exposure	<input type="checkbox"/>	<input type="checkbox"/>		
	Damage	<input type="checkbox"/>	<input type="checkbox"/>		
Gravel Erosion Protection	Erosion	<input type="checkbox"/>	<input type="checkbox"/>		
	Fabric Exposure	<input type="checkbox"/>	<input type="checkbox"/>		
	Deterioration	<input type="checkbox"/>	<input type="checkbox"/>		
	Damage	<input type="checkbox"/>	<input type="checkbox"/>		
Emergency Spillway	Obstructions	<input type="checkbox"/>	<input type="checkbox"/>		
	Cracks in Concrete	<input type="checkbox"/>	<input type="checkbox"/>		
	Deterioration	<input type="checkbox"/>	<input type="checkbox"/>		
	Damage	<input type="checkbox"/>	<input type="checkbox"/>		
Decant Structures	Weir Board Elevation	<input type="checkbox"/>	<input type="checkbox"/>		
	Depth of Water	<input type="checkbox"/>	<input type="checkbox"/>		
	Obstructions	<input type="checkbox"/>	<input type="checkbox"/>		
	Deterioration	<input type="checkbox"/>	<input type="checkbox"/>		
	Rust/Corrosion	<input type="checkbox"/>	<input type="checkbox"/>		
	Damage	<input type="checkbox"/>	<input type="checkbox"/>		
	Overflow Quality	<input type="checkbox"/>	<input type="checkbox"/>		
	Overflow Quantity	<input type="checkbox"/>	<input type="checkbox"/>		
	Flap Gate	<input type="checkbox"/>	<input type="checkbox"/>		
Gravel Road	Potholes	<input type="checkbox"/>	<input type="checkbox"/>		
	Ponding	<input type="checkbox"/>	<input type="checkbox"/>		
	Deterioration	<input type="checkbox"/>	<input type="checkbox"/>		
	Washouts	<input type="checkbox"/>	<input type="checkbox"/>		
Water Stops	Erosion	<input type="checkbox"/>	<input type="checkbox"/>		
	Membrane Exposed	<input type="checkbox"/>	<input type="checkbox"/>		
	Deterioration	<input type="checkbox"/>	<input type="checkbox"/>		
	Damage	<input type="checkbox"/>	<input type="checkbox"/>		
Reflectors Station Tags	Intact/Reflecting	<input type="checkbox"/>	<input type="checkbox"/>		
	Intact/Legibility	<input type="checkbox"/>	<input type="checkbox"/>		

FIGURE 4-3

TYPICAL INSPECTION LOG

imminent or has already occurred during the course of the inspection or any time between inspections, corrective action shall be implemented immediately with notification of the appropriate authorities.

4.4 Specific Inspection and Maintenance Objectives

A discussion of specific inspection and maintenance objectives and schedules for each item addressed in Figures 4-1 to 4-3 is presented in the following paragraphs.

4.4.1 Island in General

Inspection of the Island in general will be conducted during the routine inspections. Typical observations should include:

- Erosion gullies or rapid shoreline erosion;
- Sideslope sloughing (slippage); and
- Settling/subsidence areas;
- Causes of vegetation deterioration; and
- Rodent holes/mounds.

Locations where deficiencies are found shall be sketched with reference to easily distinguishable site features.

Routine maintenance activities related to the items identified above may include filling ruts and gullies in eroded sideslope areas, and regrading common fill to match design conditions.

Localized subsidence or surface depressions (visual or as evidenced by the presence of ponded water following a rain event) may require backfilling and regrading to protect from possible failure of the dikes, re-establish final grading, and to ensure proper drainage.

4.4.2 Access Bridge

The access bridge will be inspected regularly for signs of structural deterioration, damage due to major storm events, sinking, and debris. All structural components of the bridge should be inspected for signs of deterioration, including the bridge deck, stringers, pile caps, and piles. Any deficiencies noted should be given immediate corrective attention so that the bridge will remain in satisfactory condition to allow heavy equipment access for the post-closure care activities.

The navigational lighting installed on both sides of the bridge at approximately mid-span should also be inspected on a monthly basis and maintained in proper working order.

4.4.3 Alcoa CDF Dikes

The inspection of the CDF dikes should include visual observation of the inside and outside faces of the dikes as well as the top. Any damage or erosion to the dike or the rock armor should be noted and repaired immediately.

During initial fill with dredge material, carefully check seepage conditions at toe of dikes. On a regular basis during initial fill placement, visually inspect all around the exterior of the dikes and examine the toe for large amounts of seepage that may indicate a problem.

Check water level in the Alcoa CDF and minimize water accumulation during dredging operations to prevent seepage problems.

4.4.4 Stone Storm Protection of the Dikes

Inspections of the stone storm protection should include visual inspection of the underlayer (where visible), the armor layer, and the toe protection. The inspection should include visual observation for potential settlement, stone movement, or undermining by erosion.

4.4.5 Gravel Erosion Protection

Gravel erosion protection should be inspected for movement in the gravel and exposed filter fabric.

4.4.6 Emergency Spillway

The emergency spillway should be routinely inspected for any breaks in the concrete that may lead to future failure, and areas where undermining might have occurred. Any damage should be repaired in a timely manner.

Routine maintenance involves removing any accumulated debris or sediment from the spillway that might obstruct flow.

4.4.7 Decant Structures

Decant structures should be inspected by examining the weir boards and walkways to the weir structures, particularly after major storm events. Drainage swales and outfall structure discharge flap gates should be routinely checked for proper operation, particularly after storm events, and should be kept clear of debris and sediment accumulation.

The steel components of the decant structures should be examined for rust and corrosion. Any deterioration of the steel should be repaired as needed at the earliest convenience of the owner.

4.4.8 Service Road

The access roadways will be inspected regularly for signs of deterioration, potholes, washouts, ponding/poorly-drained areas, and debris. Any deficiencies noted should be corrected as required to ensure that the road will remain in satisfactory condition to allow the safe operation of equipment. It should be recognized by inspectors that roadway deterioration may be a sign of underlying dike problems.

4.4.9 Reflectors and Station Tags

Reflectors and station tags should be inspected periodically to make sure they are intact and functioning properly. Inspectors should examine if reflector posts are upright and if reflectors are turned perpendicular to the road. If the reflectors are broken or their reflecting properties have deteriorated significantly, the reflectors should be replaced.

Station tags are located on the reflector posts at approximately 500-foot intervals around the Alcoa CDF dikes as shown on Figure 4-2. The station tags should be inspected to make sure they are intact and legible.

4.5 Final Inspection and Maintenance Requirements

After final closure, Alcoa will review the current regulations on post-closure care and develop revisions to this section of *Volume 4* that comply. Throughout the post-closure period, Alcoa will:

- Maintain the integrity and effectiveness of the final cap, dike stability, dike armor, and soil cover systems, including making necessary repairs to any of the above, to correct the effects of settling, subsidence, erosion, or other events.
- Prevent run-on and run-off from eroding or otherwise damaging the final cap, dike armor, or final grading conditions.